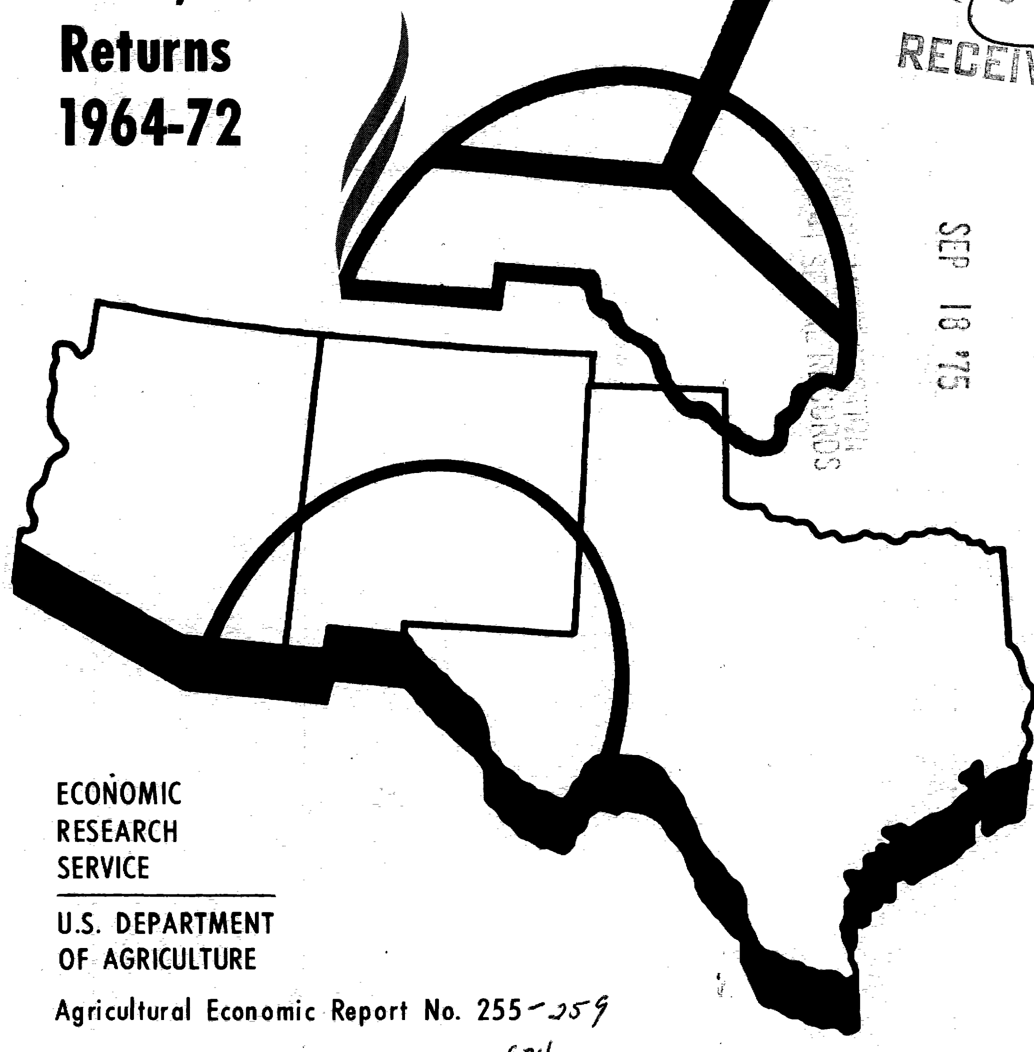
SOUTHWEST CATTLE RANCHES

Organization, Costs, and Returns 1964-72



ECONOMIC RESEARCH SERVICE

U.S. DEPARTMENT OF AGRICULTURE

Agricultural Economic Report No. 255-259
1974

ABSTRACT

Net returns in 1972 were a record high on viable commercial cattle ranches in the Southwest, one of the most important feeder calf producing areas in the United States. Favorable range conditions that reversed the drought situation of previous years and recordbreaking prices received for cattle in 1972 combined to boost returns to ranchers. Returns were large enough to pay ranchers an adequate wage for their labor, with some opportunity to reduce burgeoning indebtedness.

Keywords: Cattle, Calves, Investment, Costs and returns, Income, Ranches, Southwest.

ACKNOWLEDGMENTS

The authors express appreciation for assistance from ranchers; the Statistical Reporting Service, the Agricultural Stabilization and Conservation Service, and the Forest Service, U.S. Department of Agriculture; the Bureau of Land Management, U.S. Department of the Interior; the Farm Credit Administration; the Production Credit Associations; and the Cooperative Extension Services of Arizona, New Mexico, and Texas.

Washington, D. C. 20250 April 1974

CONTENTS

SUMMARY

A combination of favorable range conditions and favorable livestock market prices increased the net income per ranch in 1972 to over $25,000, a gain of 127 percent above the average. Net ranch income (returns to operator, family labor, management and total capital) averaged about $11,000 per year from 1964 to 1972. A loss was experienced in 1964.

The cost of ranching increased from 1964 to 1972, but costs declined in some years, as ranchers adjusted expenditures during nondrought years. After 1965, the index of prices paid by ranchers advanced steadily at a rate of 3 to 6 percentage points per year. From 1964 to 1972, the index advanced a total of 28 percent. Labor, taxes, and machinery costs increased more rapidly than did the average for all costs.

Weather conditions varied so widely in the Southwest from 1964 to 1972 that they masked trends in production. Production per unit fell sharply during the drought years of 1964, 1967, 1969, and 1970. However, the heaviest market weight of calves occurred in 1972, as ranchers pushed production of calves to take advantage of record market prices.

Ranching is big business--a 400-head ranch with 300 brood cows will involv an investment of over $500,000. When the cost of the capital investment is included with operating costs and with the value of the operator's labor and management, total costs to produce 100 pounds of live beef in 1972 were $55.24 per hundredweight. This figure was $7.34 greater than the record average of $47.90 received per hundredweight for steer calves.

Southwest cow-calf ranchers have been slow to accept new technology except in a few specified areas of operation, such as animal breeding, preventive medicine, transportation, and water and range improvement. As of 1970, very few ranchers had adopted a computerized recordkeeping system, radio communication, artifical reseeding of ranges, market information service, or preconditioning.

Capital appreciation has been a major factor in ranching. Capital appreciation per ranch, which is the change in value of ranch assets due to changes in prices of the assets rather than in any physical change, varied from $5,400 in 1964 to $57,000 in 1972 and averaged $32,000 per year, or slightly less than the average of $33,000 of gross receipts per ranch per year. The average annua capital appreciation was about three times the average net ranch income during 1964-72.

Average financial leverage ratios were unfavorable on ranches mainly because of an extremely unfavorable ratio in 1964. However, the ratio was favorable in 5 of the 9 years, and very favorable in 1972.

SOUTHWEST CATTLE RANCHES
Organization, Costs, and Returns 1964-72

Wylie D. Goodsell, James R. Gray, and Macie J. Belfield 1/

INTRODUCTION

Beef is the favorite meat of Americans. In 1972, we ate a record 116 pounds of it, compared with a per capita consumption of 189 pounds of all red meats.

Beef at the supermarket is the end product of a chain of business enterprises, the beginning of which is the ranch specializing in producing calves from beef cows. These ranches are largely in the western States and in some southern States. Southwest Texas, southern New Mexico, and southeastern Arizona are some of the most important beef-calf producing areas in the United States.

Climate and vegetation in the Southwest are not ideally suited for beef cattle production. The climate is too hot and dry for beef cattle without development of water facilities. Precipitation occurs too late in the year to provide growth of range forages during the critical spring calving period. Droughts are endemic and periodically reduce range forage production and stock water supplies, and high winds and low humidity reduce the effectiveness of the little precipitation that does occur. Likewise, range vegetation is sparse, often covering areas that erode badly during high winds or infrequent heavy downpours, and is subject to invasion by low-valued brush and scrub trees.

However, much of the land can be used for nothing other than livestock grazing. With one or two exceptions, such as phosphorus in the early spring, native forages provide a balanced ration year-round. Cold weather and winter storms causing livestock stress and losses almost never occur. Cash operating expenses per cow in the Southwest are among the lowest of any area in the United States. 2/

This report is the final report describing organization, costs, and returns of cattle ranches in the Southwest. The series began in 1956, covering 1940-54, and reports have been published each year since 1961.

1/ James Gray is a professor at New Mexico State University and Macie Belfield is a statistical assistant in the Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture. The late Dr. Goodsell was a former agricultural economist with CED.

2/ Gray, James R., Organization, Costs, and Incomes of Western Cattle and Sheep Ranches, New Mexico Agr. Expt. Sta. Bull. 587, Oct. 1971, pp. 17, 28, 38, and 42.

Focus on Typical Cow-Calf Ranch

The typical cow-calf ranch is described in terms of organization and investments in this report. Production rates and receipts are examined as well as costs and details of resources used on these ranches. Returns of various kinds are included. The data are for the 9-year period of 1964-72. The information is useful to the individual rancher for comparing his ranch's productiveness, costs, and returns with those of the typical ranch. Business firms dealing with ranchers and State and Federal Governments which propose programs that affect the Nation's beef supplies could also find the information useful.

Financial Picture Changes

Soaring demand for food both nationally and worldwide, led by a worldwide shortage of beef, has reversed the cost-price squeeze experienced by Southwest ranchers over the past three decades. The squeeze had meant that the ranchers were forced to accept little or no return on their management. Their inability to make much more than a living from ranching resulted in a steady increase in the sizes of their mortgages and loans. Their debt position would have become intolerable had population pressures, inflation, and favorable income tax rulings not combined to force land prices to increase at a rate of about 6 percent per year.

Liquidity has also been a major problem of Southwest cattle ranchers over the past three decades. While holding title to ranch real estate assets of $300,000 to $400,000, returns for family living have only been $8,000 to $10,000. Also, ranch assets (mainly land) have appreciated consistently, but erratically, from $5,400 in 1964 to $57,000 in 1972.

The outdoor life of the ranch appeals to many, both ranchers and nonranchers, and to people located in the Southwest and throughout the Nation. It is particularly appealing because work is located in a clean environment with a low density of population. Often overlooked are the long exhausting hours of physical labor, social isolation during most of the workday (most day-to-day chores are by one man working by himself), outdoor work in foul weather as well as fine, and the possibility of losing enough of the calf crop to disease, drought, theft, nutritional problems, accident, and low prices to wipe out income needed to maintain a family. Besides, inexperienced labor, machinery holdups or breakdowns, insect outbreaks, and adverse State and Federal legislation may shift the ranch business from the profit to loss side of the ledger. Uncertainty is the rule rather than the exception in a business that depends so heavily on both natural and economic factors, neither of which are controllable.

Since 1970, the economic factors in ranching have been on the positive side. National and worldwide demand for beef has pushed prices of calves to record levels. For the first time since the mid- and late-1940's, ranch returns exclusive of appreciation on ranch assets have been large enough for ranchers to reduce their mortgages and loans. Southwest ranchers were latecomers to this favorable situation in the cattle ranching industry because a severe drought reduced production and increased costs from mid-1969 to mid-1971.

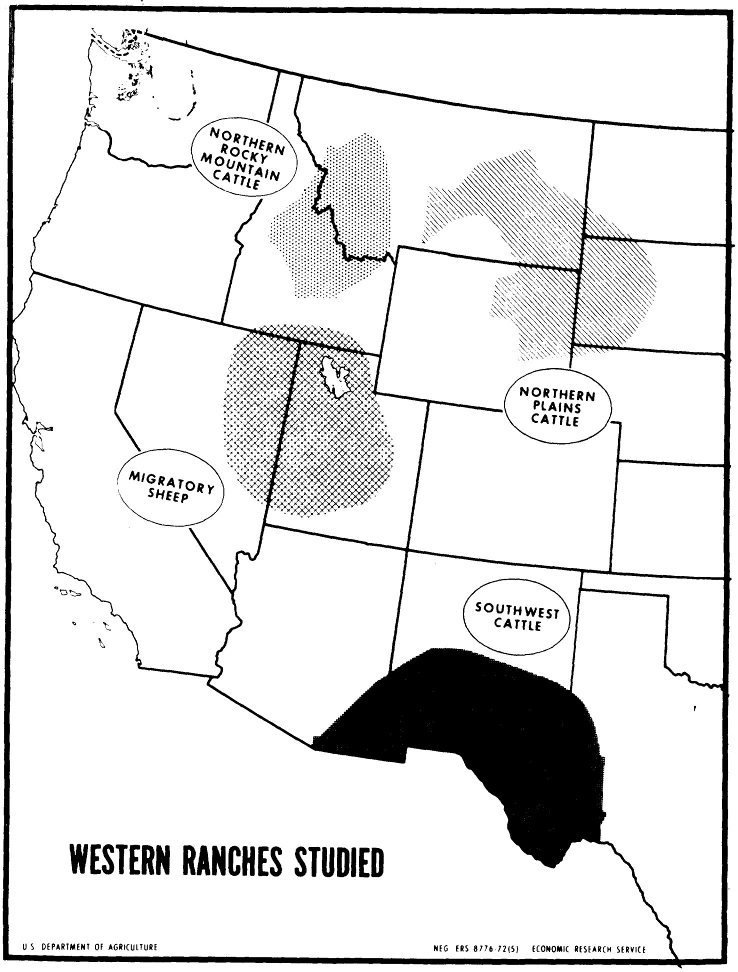


Figure 1

Data Sources Numerous

Data from this study were collected from a number of sources including: (1) questionnaires sent to farmers and ranchers by the Statistical Reporting Service, U.S. Department of Agriculture, (2) grazing permits and fees, taxes, prices, credit information, and a variety of other ranch statistical data from numerous local, State, and Federal agencies operating in the study area, and (3) specially designed surveys of Southwest cow-calf ranchers.

AREA HAS DIVERSE GEOGRAPHY

The Southwest ranching area consists of 20 counties in western Texas, 11 counties in southern New Mexico, and three counties in southeastern Arizona (fig. 1). It is the southern boundary of the western range area. Areas with ranches specializing in cow-calf production are interspersed with long, narrow valleys of high-intensive irrigated agriculture in the southern and western portions and large blocks of dryland farms in the northeastern areas. The ranches produce calves for stocker and feedlot operations which are mainly in northern Texas, southern Oklahoma, southeastern Colorado, and northeastern New Mexico. These States comprise the most important cattle feeding area in the Nation. 3/

Topography Changes East to West

The Southwest ranching area includes the southern High Plains and Trans-Pecos area of Texas; the Pecos, middle Rio Grande, and Animas valleys of New Mexico; and the eastern Gila and Santa Cruz valleys of Arizona. It varies from east to west with elevations of about 1,500 feet in the extreme southeast to the higher peaks of over 10,000 feet in Arizona and New Mexico. The area is gently rolling from its eastern boundary to the center, but it changes in the western portion to flat valleys interspersed with sharp, deep canyons and abrupt, rocky mountain ranges. Soils are often shallow and are sandy or gravelly with an occasional clay soil.

3/ Uvacek, Edward Jr., Marketing Practices to Improve Income From Cow-Calf Enterprises, Great Plains Beef Symposium, Univ. Nebr., May 29-31, 1973.

Vegetation Varies Widely

Vegetation varies widely, depending mostly on precipitation and elevation. The four general types of vegetation are grass, brush, semidesert shrub, and woodland. The grass type is found in the eastern areas but is interspersed with brush. The western areas are semidesert shrub and grass interspersed with woodlands at higher elevations. Important grasses are blue and black gama, curly mesquite, tobosa, dropseed, and buffalo grass. Important shrubs are mesquite, catclaw, shinnery oak, yucca, and mountain mahogany. Coniferous trees are piñon-juniper at intermediate elevations, and at higher elevations, one-seeded juniper, Arizona cypress, Douglas fir, and Ponderosa pine.

Precipitation Irregular

Annual precipitation varies from an average of 8.5 inches in the extreme south-central part of the area to 15 inches in the extreme west and 20 inches in the east. Areas at higher elevations receive more annual precipitation than do lower areas. From 1890 through 1955, the average precipitation was 13.89 inches. Recently (1940-72), the average has been 11.79 inches. The area averages one 2- to 5-year drought every 9 years, although droughts since 1940 have been more frequent. Since 1940, droughts have occurred in 1942-48, 1951-57, 1964, and 1969-71. Variability of precipitation over a period of years is the rule rather than the exception, usually with at least 1 year during the drought period being above the long-term average.

Most precipitation comes from convective-type thundershowers during June-October (fig. 2). Precipitation during the 5 wettest months amounted to almost 70 percent of the annual total. August is the peak month, with 2.19 inches, or 19 percent of the annual precipitation. Precipitation falls in an irregular pattern, usually in east-west bands only a few miles wide. Part of a ranch may receive adequate moisture, while part may be suffering a drought. This irregularity makes adjusting the forage supplies to livestock needs a difficult problem in range management.

RANGELAND AND ONLY TWO PEOPLE PER COW

Land ownership varies widely in the Southwest area from east to west. In the Texas portion, 90 percent of the land is owned by individuals and 10 percent by State institutions. In eastern New Mexico, 40 percent is owned by individuals, 31 percent by the Federal Government, and 29 percent by the State. The remaining portion of the Southwest area is mostly Federal (65 percent) or State owned (20 percent). In the Arizona and New Mexico portions, there are several large national forests, parks, and monuments, two large military reservations, and Federal grazing districts.

Major interstate highway and rail transportation routes cross the Southwest area from east to west and north to south. A network of secondary all-weather highways is concentrated in the northern portion of the area, with a lesser network in the west and south. However, most ranches are on side roads that are mostly 5 to 25 miles from blacktop roads.

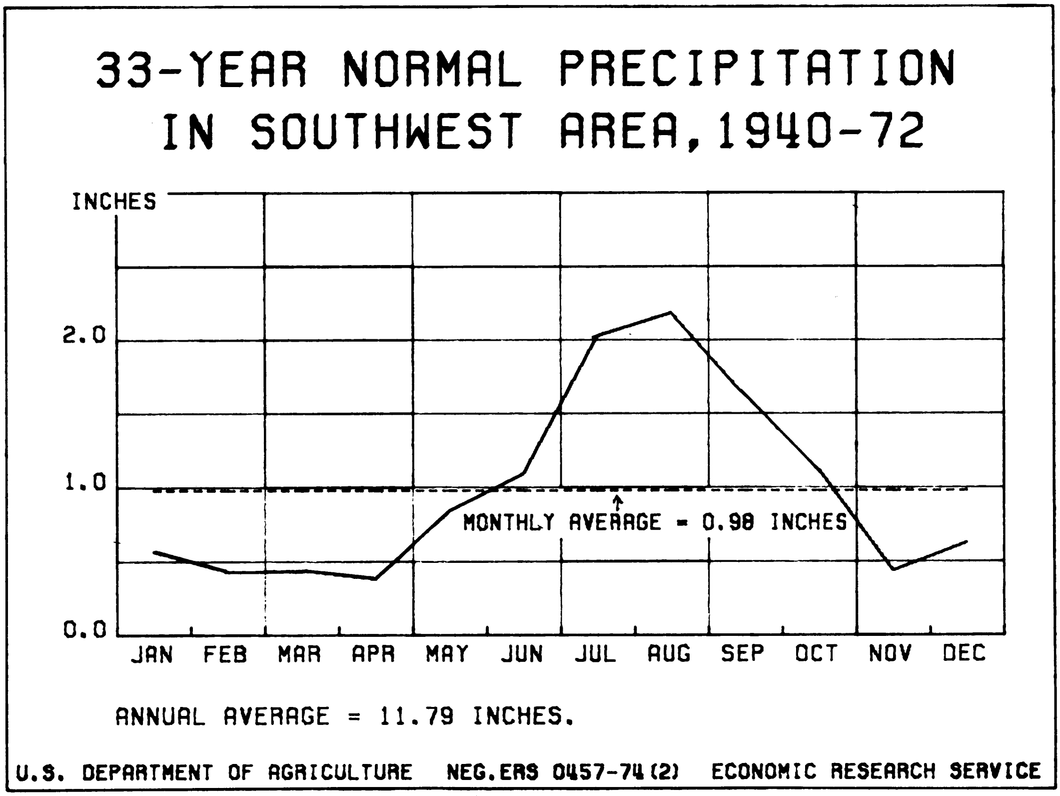


Figure 2

Feedlots have been in operation in central Arizona and northeastern and northern Texas for many decades. Development of a major feed grain producing area (mostly sorghum grain) in the Texas Panhandle and neighboring areas of New Mexico, Colorado, and Oklahoma has meant rapid expansion of this cattle feeding industry. It is now the largest in the Nation in terms of cattle fed. Cow-calf producers have a ready market at these feedlots and at the numerous cattle auctions in the area.

Population Reflects Only One Metro Area

Only one metropolitan area, El Paso, lies in the Southwest cattle area--in the extreme south-central portion. If El Paso is included in a population count, the 106,000-square-mile study area had slightly over 1 million persons in 1970, or 9.8 persons per square mile. With the metropolitan area excluded, the density was 6.5 persons per square mile.

In 1970, only 1 person in 5 was classified as rural when the metropolitan area was included, and 3 persons in 10 were classified as rural when the metropolitan area was excluded.

From 1940-70, total population increased 120 percent, an average annual rate of 4 percent. When the metropolitan area was excluded, the area increased in population at an annual rate of 3.3 percent. In 1940, over half of all residents were classified as rural, and when the El Paso area was excluded, 7 in 10 persons were classified as rural. Overall, population density in 1940 was 4.4 persons per square mile including El Paso and 3.2 persons excluding it.

Cattle Production Important

In 1969, one-third of the commercial farms and ranches in the Southwest ranching area were classified as cattle ranches, well above the percentage reported in the four southwestern States, the 11 western States, and the United States (table 1). Farms were mainly cotton farms, general farms, and farms producing livestock other than poultry and dairy cows.

Of the total land area, over 6 acres in 10 were included in farms and ranches. With 515,000 cows and heifers that calved in 1969, there were 82 acres of land in farms or ranches per cow or heifer in the Southwest ranching area. This was considerably more land per animal than in other major cattle producing regions.

RANCH ORGANIZATION AND INVESTMENT ANALYZED

The ranches studied in the Southwest area are viable cow-calf units having an average of 300 head of high-quality Hereford, Angus, or crossbred cows and heifers. Between 1965 and 1970, a third to a half of the ranchers attempted some crossbreeding, mainly with Herefords and Anguses and more recent imports from Europe and Asia. Almost all ranchers had six to 12 horses. Few had sheep, goats, or other kinds of domestic livestock.

Land Base Includes Leased Land

In 1972, the land base on a Southwest cow-calf ranch consisted of about 28 sections of operator-owned grazing land, six sections of land leased from other individuals, and five sections leased from the State or Federal Government (table 2). In 1972, the typical rancher had a grazing permit in a Bureau of Land Management grazing district of 440 animal-unit months (based on the animals' monthly consumption of feed and forage). The ranch consisted entirely of grazing land, with no cropland on the ranch. Although some ranches in the northeastern part of the study area have some cropland producing hays and feed grains, most ranchers in the southeastern, central, and western portions did not farm any part of their ranches.

Herd Size Stable

The breeding herd, including replacements, averaged about 360-380 head per ranch (table 3) during 1964-72. This included about 300 cows and heifers of breeding age, 16 or 17 bulls, and about 60 replacement heifer calves. Additionally, off-season steer calves were usually held over unless the area was drought stricken. During drought, cow numbers as well as steer calf numbers were reduced sharply. However, during drought and drought-recovery periods, heifer calf numbers were maintained or increased in order to build back herds to normal size.

Table 1--Land area, land in farms, and type of farm, selected areas and United States, 1969

Item	Unit	Southwest 1/	South-western States 2/	Western States	United States
Land area	1,000 acres	67,638	331,198	721.177	2,263,591
Land in farms	do.	42,326	263,570	327,823	1,063,346
As a percent of total land area	Percent	63	80	45	47
Cows and heifers that have calved	1,000 head	515	8,707	8,162	45,511
Acres of farmland per cow	Acres	82	30	40	23
Type of farm: 3/					
Cash grain	Percent	6.7	15.2	13.6	21.3
Cotton	do.	28.4	9.9	1.5	2.3
Other field crop	do.	.7	2.4	3.6	4/7.0
Vegetable	do.	2.1	.8	2.6	1.1
Fruit and nut	do.	1.1	1.1	17.4	3.1
Poultry	do.	.7	1.9	1.9	3.3
Dairy	do.	1.1	3.8	8.1	15.1
Livestock ranches	do.	33.0	26.0	13.1	4.6
Livestock, other than poultry, dairy, and ranches	do.	11.5	28.2	23.1	32.8
General	do.	12.9	9.3	10.4	7.3
Miscellaneous	do.	1.8	1.4	4.7	2.1
Total	do.	100.0	100.0	100.0	100.0

1/ Consists of 20 counties in Texas, 11 counties in New Mexico, and three counties in Arizona.
2/ Consists of Arizona, New Mexico, Oklahoma, and Texas.
3/ Farms with sales of $2,500 and over.
4/ Includes tobacco.

Source: 1969 Census of Agriculture.

Table 2--Southwest cattle ranches: Land use per typical ranch studied, 1972 1/

Item	Acres
Total land operated	17,720
Grazing land	17,720
Owned	10,320
Rented:	
Private	4,110
State and Federal	3,290
Grazing permits: Bureau of Land Management (AUM's) 2/	440

1/ Preliminary.
2/ Number of cattle 6 months of age or older multiplied times the number of months of the grazing permit.

Table 3--Southwest cattle ranches: Cattle per ranch, Jan. 1, 1964-72 1/

Year	Total cattle	Brood cows and heifers	Calves		Bulls
			Heifers	Steers	
			Number		
1964	387	304	43	23	17
1965	393	301	59	16	17
1966	393	289	59	28	17
1967	387	300	62	8	17
1968	392	304	55	16	17
1969	393	309	51	16	17
1970	395	277	47	55	16
1971	387	280	71	20	16
1972 2/	397	276	80	3/25	16

1/ Study area consists of 20 counties in Texas, 11 counties in New Mexico, and three counties in Arizona.
2/ Preliminary.
3/ Includes five yearling steers.

Consequently, total cattle numbers were maintained with little variation during 1964-72--from 387 to 397 head. A ratio of about one bull for each 17 cows and heifers of breeding age, or six bulls per 100 cows was maintained during this period.

Starting in July 1971, high livestock prices and a break in the drought encouraged ranchers to increase their herds in the latter part of 1971 and during 1972. Although brood cow and heifer numbers could not be increased rapidly over an 18-month period, the number of heifer calves held back for replacement increased 70 percent during 1970-72. As a result of this holdback, brood cow and heifer numbers per ranch in December 1972 reached a record of 324.

Ranchers attempted to replace about 17 percent of their cows each year during 1964-72. Losses in the cow herd were usually very low, from 1 to 2 percent. Consequently, most calves replaced older cows or cows with breeding, calving, or nursing problems rather than animals that had died.

Production Practices Vary Little

Production practices on cow-calf ranches are similar throughout the west. The bulk of the cows are bred to calve in the spring, and calves are weaned and sold mostly in the fall. Cattle graze native grass pastures except during brief periods in the winter. Ranchers hire little labor during most of the year, with peak hirings during spring branding and fall marketing. Some differences do occur, though, depending on the climate, topography, land ownership pattern, type of vegetation, availability of water, sources of capital, and locations of markets.

Feed Supplements Used

In the Southwest grazing area, ranchers customarily feed supplements to their livestock for about 3 months--January-March. A wide variety of supplements may be used: a 22- or 43-percent protein block--a mixture of hay, grain, and cottonseed meal in pellets of about 20 percent protein--a salt-cottonseed meal mixture, sorghum bundles, or alfalfa hay. In a drought year, the feeding period will be extended if necessary until rains or showers occur and range forages become available. The animals are fed every other day, usually on the range. The ration is adjusted to available range forages. In a nondrought year, the ration is mainly protein and grain supplements. In drought years, it consists of roughages, drought prograin sorghum grain, corn, barley, and cottonseed cake. Bulls as well as individual animals in poor condition may be fed hay at any time.

Year-Long Breeding Programs Popular

Year-long breeding programs are popular on Southwest cow-calf ranches, although many ranchers are shifting to seasonal breeding. Ranchers buy young registered bulls which are not necessarily the same breed as the cows. These young bulls, 1 to 2 years old, are usually placed with a few older and proven bulls in the cow herd. The young bulls may be left with the herd after the older bulls are removed.

Prior to 1968, almost all cattle in the Southwest were purebred Hereford or Angus, but crossbreeding cattle is becoming increasingly popular. Although some confusion exists concerning the best crosses, ranchers are using the following breeds in their programs:

Angus	Chianina	Red Angus
Beefmaster	Hereford	Red Brahman
Brahman	Limousin	Red Brangus
Brangus	Maine-Anjou	Santa Gertrudis
Charolais	Marchigiana	Simmental

Heifers are usually bred to calve as 2 year olds. The peak in the calving season occurs from late February to early April. Ranchers in the Southwest prefer to leave alone, as much as possible, mature animals that are calving. The ranchers observe the herd daily from a distance and only approach quietly to help a cow in difficulty. Heifers that are calving are watched more closely and may be confined in small pastures, or "traps."

Culling Practices Differ

Ranchers in the Southwest do vary widely in their culling practices. Some ranchers cull all cows that reach a given age. Others will not cull those that have been good breeders. When culling for age, most bulls are removed after 3 to 5 years of service. Cows may be kept in service for 7 to 10 years. Nonbreeders or poor breeders--cows with persistent calving difficulties and those producing poor calves--are also culled. Although most culling occurs in the fall, open cows and heifers--animals injured or afflicted with some permanent disability--may be sold at any time during the year.

Marketing Contracts Gain Popularity

Calves are sold from late September to December. Ranchers may sell directly or by contract to local buyers, buyers for feedyards, or commissionmen. Animals not sold in the main sales or those which fail to meet specifications (cutbacks) may be trucked and sold at local auction markets. Contracting is gaining in popularity in the Southwest, where repeat contracting is the rule rather than the exception. Most contracts are made in August and September for delivery in October and November.

Range Control and Minimum Herding Practiced

In this year-long grazing area, many ranchers practice some rotation or deferred grazing program to take advantage of seasonal grasses and to graze areas with less desirable grass and brush species when it is most desirable or least dangerous (due to toxicity of plants) to do so. Brush control programs are popular, particularly in the eastern portion and areas with low-valued trees. Cactus control programs also are popular in the eastern portions of the area.

Of ranch improvements, water developments have commanded the attention and resources of most ranchers in the Southwest. These developments include stock wells, plastic pipelines, and steel-rim and earthen stock tanks. Most ranches have been fenced extensively for many years, so most of the fence building during 1964-72 was either to replace or repair old fencing.

Ranchers see most or all of their animals only when they are moved from one part of the ranch to another, during the calving season, at branding, during the marketing season, and during the winter supplementing season. Although occasional inspection trips are made to observe parts of the herd to see how the animals are doing and to estimate current range forage supplies, some cattle may not be inspected for several weeks. Minimum rather than maximum herding is the rule in the Southwest.

Capital Available, Labor Scarce

Credit from operating capital has been readily available in the Southwest area from banks, production credit associations, and private lenders. The land market in the study area has not been as active as that of most range areas with larger recreation potentials. However, in some areas, desert-type retirement communities have become established, particularly in southeastern Arizona, western New Mexico, and western Texas. Long-term capital for land acquisition, new structures, and range developments has been available from Federal land bank associations, insurance companies, banks, and individuals. Also, many ranches are owned by individuals who derive capital from their other business interests.

Labor, particularly seasonal labor, is scarce in the area. Year-round labor is hard to find, and quality labor is generally unavailable at the prevailing wage rate unless the rancher is willing to hire on a long-term basis. Ranch hands who chose or were forced into ranch work during the depression and drought of the 1930's have largely disappeared. The labor supply was not replenished during the 1940's as many young men who went into the armed forces during World War II returned to pursuits other than ranching. Most of the young men who recently have chosen ranching as careers either inherited ranches, used inherited money to buy them, or married women who subsequently inherited ranches. During the 1960's, some college graduates chose ranch careers, but only if there were some opportunities to gradually acquire control of the ranches on which they would be employed.

Technology Adoption Slow

In general, ranchers have been slow to adopt new technology except in a few specific areas such as animal breeding, preventive medicine, transportation, and some kinds of range improvements. They have been reluctant to adopt modern business methods in decisionmaking, particularly in accounting methods and marketing. Conflicts often arise between ranch traditionalism and the profit motive and modern technology.

A survey of 63 Southwest ranchers with 200-500 head of cattle showed that over half of the ranchers had attempted to install or adopt plastic pipelines, selective breeding programs, rotation or deferred grazing, and brush control programs by 1970 (table 4). Almost half of them had attempted crossbreeding and compressed-block feeding programs. Very few ranchers had adopted a computerized recordkeeping system to aid in decisionmaking or radio communication to make more efficient use of their time and travel. Half or more of the 20 practices listed in table 4, except selective breeding and rotation or deferred grazing, were adopted during the 1960's.

Table 4--Southwest cattle ranches: Number of ranches adopting selected practices and dates adopted, 1970

Practice	Number of ranches		Proportions 1/ where adopted			
	Adopting practices	Not adopting practices	Before 1940	During 1940's	During 1950's	During 1960's
	---Number---		-------Percent-------			
Plastic pipelines	41	22	2	2	17	78
Selective breeding	36	27	19	28	36	17
Rotation or deferred grazing	36	27	11	25	39	25
Brush control	36	27	3	6	36	55
Crossbreeding	31	32	0	13	26	61
Compressed-block feeding	31	32	0	3	3	94
Market information service	25	38	4	16	40	40
Pregnancy testing	25	38	0	0	8	92
Range and ranch analysis	18	45	0	11	33	56
Artificial reseeding	14	49	0	21	36	43
Preconditioning	10	53	0	30	20	50
Chemical analysis of feed	10	53	0	0	40	60
Liquid feeding	9	54	0	0	11	89
Irrigated pastures	6	57	0	0	33	67
Electric fencing	6	57	0	0	0	100
Growth hormones	4	59	0	0	50	50
Artificial insemination	4	59	0	0	25	75
Computer recordkeeping	4	59	0	0	0	100
Radio communication	4	59	0	0	0	100
Miscellaneous 2/	1	62	0	0	0	100

1/ May not add to 100 because of rounding error.
2/ Range fertilization, suspension fencing, air patrol, and custom feeding.

Land Represents Largest Investment

Land has been the largest single investment on Southwest cow-calf ranches. In 1965, the investment per ranch in land was over $250,000, compared with $370,000 in 1971 (table 5). With improvements, the 1972 real estate investment in a Southwest cow-calf ranch with about 300 brood cows was over $450,000. Over 81 percent of the total ranch investment was in land.

Market prices per acre for unimproved rangeland in 1972 increased over 50 percent from 1964, an average annual rate of 6.6 percent. During this period, changes in land prices varied widely in the area, with lands in Texas increasing in value at a much more rapid rate than the average for the area, and lands in Arizona advancing at only half of the average rate of increase.

The number of improvements did not increase substantially on Southwest cow-calf ranches during 1964-72, as most investments were made to replace or repair worn out fences and structures. Rather, most of the increase in value occurred because of the inflation in ranch real estate values.

The real estate investment per brood cow was $1,000 in 1964 but increased to $1,600 by 1972 (fig. 3). The 1972 investment in livestock per brood cow of $333 was approximately twice the $163 per cow in 1964. Although machinery and equipment investment per brood cow was minor compared with the investment in real estate and livestock, the value of this investment increased over 40 percent (mostly because of inflation) in the 9-year period.

Total investment per brood cow in 1972 reached a record high--slightly over $2,000 per cow. This was a 69-percent increase over 1964.

Animal units, based on the animals' yearly consumption of range forages and feed, are a convenient measure of ranch size. A 1,000-pound cow nursing a calf is rated as one animal unit. For other cattle, 1.33 yearlings are an animal unit, and 0.83 bull equals an animal unit.

The investment per animal unit is much higher on Southwest cow-calf ranches than on cow-calf ranches in the Northwest or sheep ranches in the Great Basin (table 6). The investment per animal unit in livestock and machinery is comparable although machinery investment on sheep ranches is less than that on cattle ranches. The major difference among the western ranch types occurs because of variation in land tenure and seasonal versus year-long grazing. In year-long grazing areas, mostly under private ownership, land investments are larger than in areas where grazing is seasonal, particularly when some seasonal grazing takes place on public lands, as in the case of migratory sheep ranches.

Table 5--Southwest cattle ranches: Investment in real estate for typical ranch studied, 1964-72 1/

Year	Unimproved rangeland			Investment per ranch				
				Building		Range improvements		Total
	Owned acres	Price per acre	Total land	Service	Dwelling	Stock water	Other range	
				Dollars				
1964-------	10,160	24.00	243,840	7,500	11,500	21,240	20,400	304,480
1965-------	10,160	25.00	254,000	7,600	12,000	21,450	21,100	316,150
1966-------	10,160	27.75	281,940	7,900	12,500	22,100	22,400	346,840
1967-------	10,160	32.50	330,200	8,350	12,850	22,550	23,100	397,050
1968-------	10,320	33.25	343,140	8,500	13,300	23,450	23,500	411,890
1969-------	10,320	35.25	363,780	8,600	13,970	24,150	23,950	434,450
1970-------	10,320	35.75	368,940	8,700	14,100	24,500	24,200	440,440
1971-------	10,320	36.25	374,100	8,800	14,300	24,700	24,400	446,300
1972-------	10,320	36.75	379,260	9,000	14,700	24,800	24,700	452,460

1/ Preliminary.

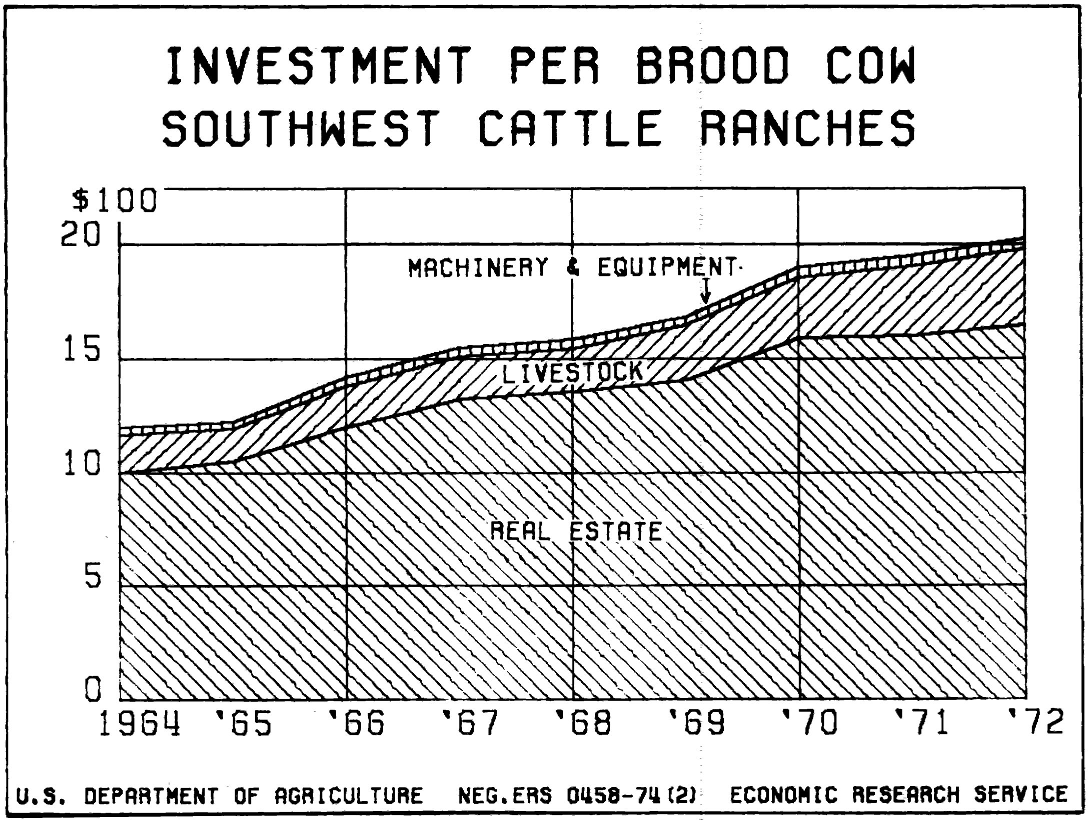


Figure 3

DROUGHTS POSE FORAGE PROBLEMS

Cow-calf ranches in the Southwest can modify but not completely overcome effects of drought--the most serious problem. The amount of range forages produced in this semiarid area depends largely on the amount and seasonality of precipitation. Ranchers can buy feed to replace denuded ranges and maintain animals at maximum levels of nutrition and growth (a costly alternative), or they can reduce feed purchases and improve and manage ranges so that they are more productive in years with favorable precipitation or suffer least damage in drought years. Range conditions that determine how much range forage will be available are determined largely by prior management and by how much precipitation is received in an area, when it occurs, and how fast it falls. From 1950 to 1957, range forage conditions were far below the 1965-67 average (fig. 4). Conditions declined until 1965, and they have fluctuated widely since then. Annual precipitation has followed almost the same pattern, except when an occasional year of average or above average precipitation during a drought failed to affect range conditions appreciably.

Table 6--Investment per animal unit, selected western livestock ranches, 1960, 1965, and 1972 1/

Item	Cattle ranches									Migratory-sheep ranches 5/		
	Northern Plains 2/			Rocky Mountains 3/			Southwest 4/					
	1960	1965	1972	1960	1965	1972	1960	1965	1972	1960	1965	1972
	Animal units 6/											
Number	403	430	454	344	361	411	NA	348	341	470	484	491
	Dollars											
Investment in land and buildings	484	581	796	400	526	563	NA	908	1,327	247	255	284
Livestock	162	133	245	161	141	247	NA	124	268	111	121	152
Machinery and equipment	35	37	49	40	43	51	NA	30	38	23	24	34
Crops	7	10	15	24	30	32	NA	0	0	2	2	3
Total	688	761	1,105	625	740	893	NA	1,062	1,633	383	402	473

NA = Not available.

1/ Preliminary.
2/ Consists of 15 counties in Montana, eight counties in Wyoming, and nine counties in South Dakota.
3/ Consists of 12 counties in Montana and seven counties in Idaho.
4/ Consists of 20 counties in Texas, 11 counties in New Mexico, and three counties in Arizona.
5/ Consists of 19 counties in western Utah and six counties in eastern Nevada.
6/ An animal unit consists of 1.0 cow or heifer 2 years old and over, 1.33 steers or heifers 1 year old, 0.83 bull of breeding age, or 5.0 head of stock sheep.

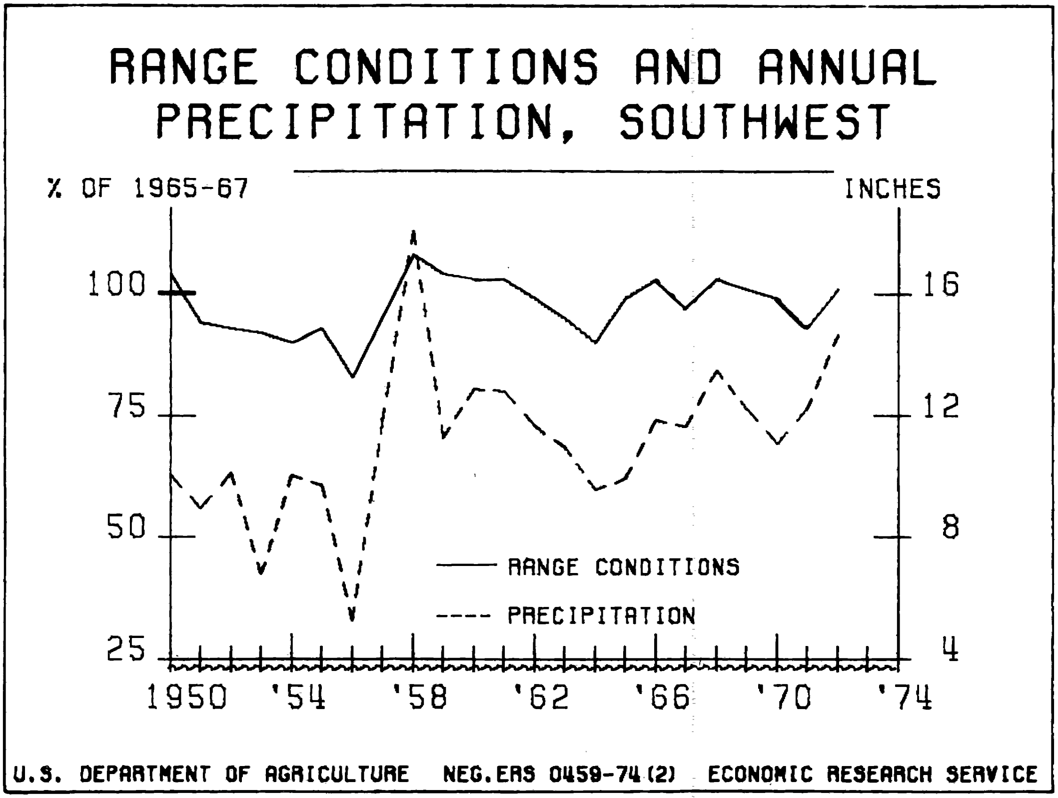


Figure 4

The time of the year that precipitation occurs can have a large or negligible effect on current range forage conditions. For example, in 1971, range conditions declined precipitously from 1970's below-average conditions, while annual precipitation increased moderately. After a dry winter, spring, and summer, widespread showers occurred in late August, almost too late to make forage for the winter. Conditions changed from "bad" in July to "good" in September. Overall, the year was rated from poor to fair. Much of the precipitation in 1971, which was more than that received in 1970, was almost too late to benefit calves born in February-April and sold in October-November. The late rains did stimulate some grass growth in the fall of 1971, thus permitting ranchers to reduce roughage supplements during the winter of 1971-72 and to stop supplemented feeding early in the spring of 1972. This 1971 mid-year grazing situation was repeated in 1972, except that the carryover of moisture from late 1971 permitted adequate forage supplies in the early spring of 1972. Supplies were nearly exhausted by June, but extremely favorable moisture conditions starting in June meant very heavy supplies of range forages during the fall, winter, and spring of 1972-73. In June and July of 1972, four general storms occurred; in August-September there were six storms, and six more in October alone.

PRODUCTION RATES INVOLVE THREE FACTORS

The three most important livestock production rates on cow-calf ranches are calving percentages, death loss percentages, and calf market weights. On Southwest cow-calf ranches, calving percentages usually averaged in the mid- and upper-80's (table 7). However, calving percentages have trended downward on Southwest ranches, compared with upward trends in the western States and on cow-calf ranches in the Northwest (fig. 5). Generally, unfavorable weather and range conditions in the Southwest since 1966 are responsible for the downward trend.

Death loss percentages varied between 2 and 4 percent, while individual ranches may lose as much as 10 percent in isolated cases of disease outbreaks, infrequent storms or cold weather, theft, poisonous plants, nutrition, or calving problems. A critical time for death losses of younger animals on most cow-calf ranches is between birth and weaning.

Market weights of calves have increased 10 to 15 pounds per head from 1964-66 to 1970-72, mostly because of crossbreeding.

Net ranch production is the value of all products produced per Southwest ranch less the value of feed and livestock purchased and changes in price levels for all items produced or purchased for the ranch. As such, it includes all livestock production measures. The relationship between changes in net ranch production and market weight of fall calves is not close (fig. 6). In 6 of the 9 years studied, the five measures changed together. In the remaining 3 years, they changed in opposite directions. Since 1968, ranchers have been able to maintain market calf weights but have failed to increase calving percentages.

SALES INCREASE IN VALUE

The most noticeable feature of livestock sales on Southwest cow-calf ranches from 1964 to 1972 is the increase in value of sales (table 8). The dollar value of sales in 1972 was approximately twice the value in 1964. Prices received for all classes of cattle were mainly responsible for the increase, with steer calf prices increasing from $19.76 per hundredweight of live calf in 1964 to $47.90 per hundredweight in 1972.

Approximately $6.00 out of every $10.00 that the rancher received in 1972 was from the sale of calves. Steer calves alone accounted for $4.00 out of every $10.00. Cows, mostly cull cows for slaughter, were the second most important class of cattle sold, accounting for more than $2.00 out of every $10.00 in sales. Heifer calves made up less than $2.00 out of $10.00, and all other cattle (yearlings and bulls) accounted for the remaining $2.00.

Steer calves were the major product sold by Southwest cow-calf ranches in 1972, with 32 percent of the total weight sold being steer calves. Cows ranked second, with 30 percent. Others were heifer calves and yearlings (17 percent) and bulls (4 percent). Cow sales were the most variable over the years, with heavy culling in drought years (1969) and light culling when years with favorable precipitation coincided with high livestock prices as in 1972.

Table 7--Southwest cattle ranches: Cattle production rates for typical ranches studied, 1964-72 1/

Year	Calf crop percentage 2/	Death loss percentage 3/	Average market weights for: Yearlings: Cows	Yearlings: Steers	Yearlings: Heifers	Calves: Steers	Calves: Heifers	Calves: Bulls
	---Percent---		------------Pounds------------					
1964---	84	4	890	590	570	385	370	1,300
1965---	88	3	930	640	610	420	400	1,350
1966---	89	4	950	660	630	430	410	1,500
1967---	86	2	920	640	610	410	390	1,400
1968---	86	4	940	650	620	420	400	1,450
1969---	85	3	897	628	613	428	408	1,300
1970---	84	3	890	618	597	410	392	1,290
1971---	83	4	920	630	618	420	408	1,350
1972---	85	3	940	650	620	440	420	1,450

1/ Preliminary.
2/ Number of calves weaned or sold divided by the number of cows and heifers in breeding herd on Jan. 1 of each year.
3/ Number of animals that were lost or died during the year divided by the number of animals in the herd on Jan. 1 of each year.

RANCH COSTS RISE

The price-cost squeeze in agriculture has been well publicized. Costs have increased on ranches almost continually since the late 1930's, while prices received for beef cattle have fluctuated widely.

Costs are usually divided into categories, with the most common being groupings of major cost items such as feed, labor, and taxes. Additionally, costs can be grouped into various kinds of payments for the use of resources. Resource groups are most commonly divided into: (1) operating expenses (cash expenses and depreciation), (2) payment to the operator and his family for their labor and management, and (3) capital costs, with the value of land being included as a part of the capital.

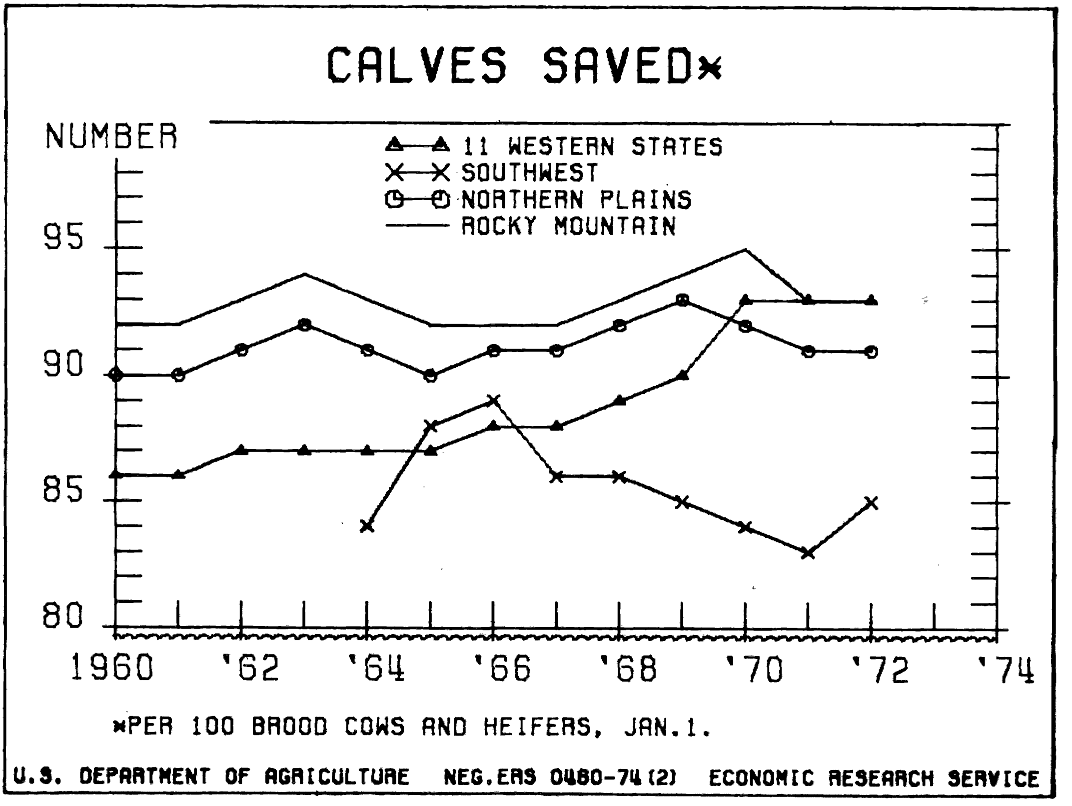


Figure 5

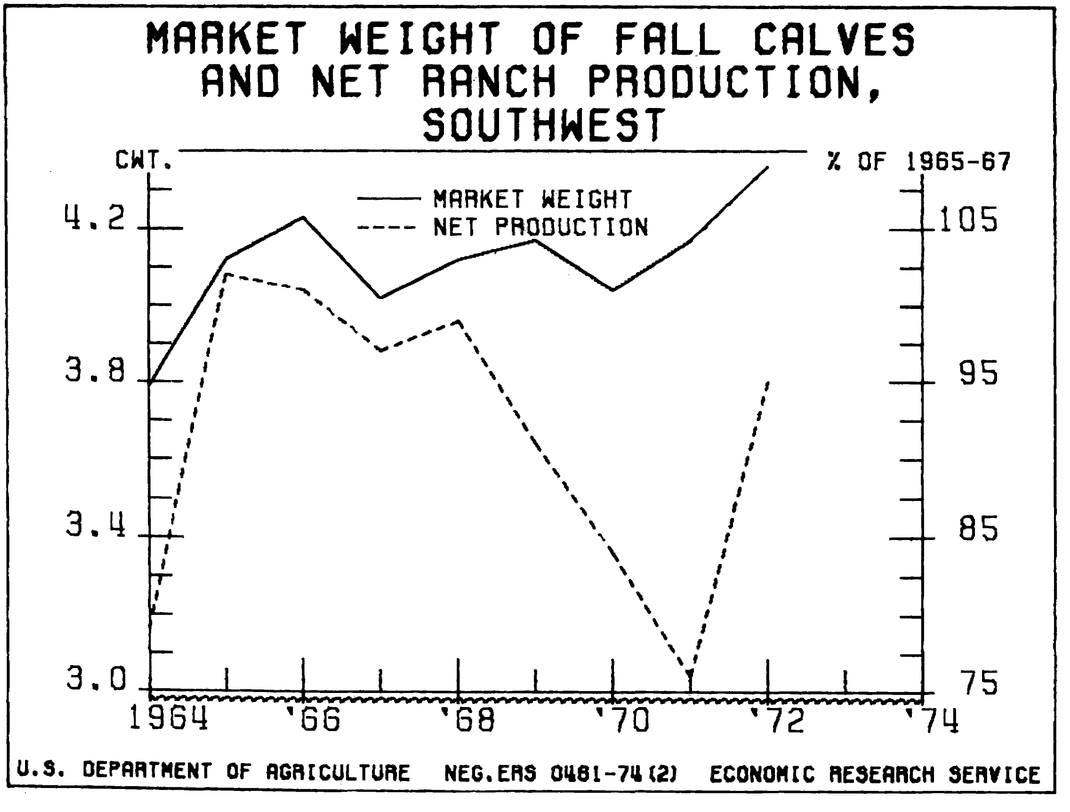


Figure 6

Table 8--Southwest cattle ranches: Cattle sales per typical ranch studied, 1964-72 1/

Item	Unit	1964	1965	1966	1967	1968	1969	1970	1971	1972
Cows:										
Amount sold-----	Cwt.	480.60	530.10	380.00	340.04	357.20	672.75	311.50	423.20	131.60
Price per cwt.--	Dol.	11.39	14.06	15.75	15.75	16.73	19.40	19.54	22.10	27.00
Sales-----------	Do.	5,474	7,453	5,985	5,356	5,976	13,051	6,087	9,353	3,553
Steers & heifers:										
Amount sold-----	Cwt.	135.50	348.70	253.50	186.60	224.20	167.45	362.94	229.98	93.60
Price per cwt.--	Dol.	16.74	20.67	23.15	23.15	24.60	28.52	28.72	32.20	36.35
Sales-----------	Do.	2,268	7,208	5,869	4,320	5,515	4,776	10,424	7,405	3,402
Bulls:										
Amount sold-----	Cwt.	39.00	54.00	75.00	70.00	58.00	78.00	38.70	54.00	58.00
Price per cwt.--	Dol.	14.35	17.71	19.84	19.84	21.07	24.44	24.61	27.83	31.80
Sales-----------	Do.	560	956	1,488	1,389	1,222	1,906	952	1,503	1,844
Calves, steers:										
Amount sold-----	Cwt.	396.55	420.00	490.20	446.90	453.60	308.16	377.20	373.80	536.80
Price per cwt.--	Dol.	19.76	23.81	26.57	27.14	28.81	32.86	34.53	39.40	47.90
Sales-----------	Do.	7,836	10,000	13,024	12,129	13,068	10,126	13,025	14,728	25,713
Calves, heifers:										
Amount sold-----	Cwt.	240.50	276.00	250.10	280.80	304.00	330.48	164.64	130.56	130.20
Price per cwt.--	Dol.	17.73	21.36	23.92	24.35	25.84	29.48	30.98	35.40	43.90
Sales-----------	Do.	4,264	5,895	5,982	6,837	7,855	9,743	5,101	4,622	5,716
Total sales-------	Do.	20,402	31,512	32,348	30,031	33,636	39,602	35,589	37,611	40,228

1/ Preliminary.

The major operating expenses are: (1) feed costs and lease or grazing fees, (2) livestock purchases and supplies, (3) machinery expense, (4) buildings and improvement, maintenance, and repair, (5) property taxes, (6) hired labor costs, and (7) a miscellaneous group, largely utility expense.

Feed Costs Vary, Grazing Fees Increase

Southwest cow-calf ranchers typically bought about 50 tons of hay each year for bulls, sick animals, cows, heifers, and horses during severe weather and when the animals were confined (table 9). When drought reduced forage supplies and extended the normal feed year beyond the early spring months, the ranchers bought twice the amount of hay. Most hay purchased was alfalfa hay which was produced on irrigated farms in or adjacent to the Southwest. The price paid for hay depended mostly on available supplies and quantities demanded by other users, mainly dairies and feedlots. Consequently, prices paid were not necessarily related to the quantities purchased by ranchers.

Cow-calf ranchers in the Southwest fed grain mainly to horses, bulls, and the hospital herd. About 20 tons of feed grains were fed each year, increasing to 26 tons during drought years. The amounts of grain and protein concentrates fed varied less from year to year than did the amounts of hay fed.

The dollar value of feed grains used was much less than that of hay and protein concentrates. The total cost of purchased feeds usually varied from $4,000 to $6,000 per ranch but increased to $8,000 in the second year of a drought period.

In the Southwest, large amounts of rangelands have been leased. With the possibilities of uncovering mineral deposits, some ranch owners have been reluctant to sell their ranches. Consequently, the alternative chosen has been to lease their ranches either as a unit or in parts to adjacent ranchers. About 6.5 sections of land, or 4,110 acres, were leased from individuals (table 10). The cost per acre increased moderately from 1964 to 1972. The actual cost per acre did not fluctuate as widely from year to year as did current lease rates because most leases for private lands were negotiated for a period of several years at the then current rate. Likewise, with scattered sections of State lands in western New Mexico and Arizona and large blocks of these lands in eastern New Mexico and Texas, cow-calf ranchers leased about five sections (3,290) of rangeland from State agencies and institutions. Leasing terms on State lands have been similar to those on private lands--that is, terms longer than 1 year, freedom to graze at the rate, season, and with the kind of livestock as determined by the ranchers, and some freedom to sublease. Lease prices have increased at a more rapid rate than lease rates on private land in general, but at a lesser rate than those on Federal lands.

Some Federal lands in the Southwest were leased on a long-term basis, some on an annual bid, but most were on an annual permit basis. On a permit basis, the rancher paid a fee based on the number of months a specified number and type of livestock grazed on the lands. The rates on private and State lands on a per acre basis were not comparable to those on Federal lands on a per animal-month basis. Also, Federal grazing regulations caused increased operating costs. Grazing fees for Federal lands more than doubled from 1964 to 1972. Although

Table 9--Southwest cattle ranches: Feed costs per typical ranch studied, 1964-72 1/

Item	Unit	1964	1965	1966	1967	1968	1969	1970	1971	1972
Hay:										
Amount bought---	Tons	78.1	72.6	52.6	58.4	47.0	56.6	76.0	106.6	57.7
Price per ton---	Dol.	31.86	26.86	27.89	29.04	24.68	32.76	37.54	43.82	43.82
Total costs-----	Do.	2,488	1,950	1,467	1,696	1,160	1,854	2,853	4,671	2,528
Grain:										
Amount bought---	Cwt.	136	112	125	135	145	159	180	192	180
Price per cwt.--	Dol.	2.96	3.12	3.01	3.01	2.82	3.10	3.06	3.17	3.97
Total costs-----	Do.	403	349	376	406	409	493	551	609	715
Protein concentrates:										
Amount bought---	Tons	26.2	21.2	22.5	19.1	18.2	19.9	22.5	26.4	20.6
Price per ton---	Dol.	85.10	85.96	103.15	102.29	99.71	98.00	100.00	98.00	103.00
Total costs	Do.	2,230	1,822	2,321	1,954	1,815	1,950	2,250	2,587	2,122
Salt & minerals:										
Amount bought---	Cwt.	61	61	65	61	62	62	59	63	59
Price per cwt.--	Dol.	2.11	2.11	2.09	2.16	2.21	2.26	2.63	2.71	2.93
Total costs-----	Do.	129	129	136	132	137	140	155	171	173
Total feed costs--	Do.	5,250	4,250	4,300	4,188	3,521	4,437	5,809	8,038	5,538

1/ Preliminary.

Table 10--Southwest cattle ranches: Lease costs and grazing fees per typical ranch studied, 1964-72 1/

Year	Private land leased			State land leased			Federal land fee			Total lease costs & grazing fees
	Acres	Rate	Cost	Acres	Rate	Cost	Unit months	Rate	Cost	
	Acres	---Dollars---		Acres	---Dollars---		AUMS	---Dollars---		
1964--	4,110	.50	2,055	3,450	.24	828	480	.30	144	3,027
1965--	4,110	.51	2,096	3,450	.25	862	480	.30	144	3,102
1966--	4,110	.52	2,137	3,450	.26	897	470	.33	155	3,189
1967--	4,110	.53	2,178	3,450	.27	932	465	.33	153	3,263
1968--	4,110	.54	2,219	3,290	.27	888	458	.33	151	3,258
1969--	4,110	.55	2,260	3,290	.27	888	451	.33	149	3,297
1970--	4,110	.56	2,302	3,290	.29	954	448	.44	197	3,453
1971--	4,110	.53	2,178	3,290	.30	987	448	.64	287	3,452
1972--	4,110	.57	2,343	3,290	.31	1,020	440	.66	290	3,653

1/ Preliminary.

some ranchers in or near large Federal grazing districts have been affected greatly by increased grazing fees, the typical Southwest rancher, who holds only a small grazing permit, has been affected only slightly, as grazing fees represent a small proportion of total operating costs. On the average, Southwest cow-calf ranchers paid $3,000 to $3,700 each year for leases and grazing fees.

Bulls Push Replacement Costs Up

Since bulls are in service only 3 to 5 years, ranchers replaced older bulls each year, and occasionally they replaced a bull that did not perform as expected or a bull that had been injured so as to reduce his effectiveness (table 11). The price of bulls increased each year or every other year during 1964-72, and in 1972 was 44 percent higher than in 1964. The cost of replacement bulls was the major part of total replacement costs.

Normally, ranchers raised their own replacement cows. However, if range conditions appeared to be favorable, or if heifer calves or yearlings were being sold at liquidation prices, or if ranchers liked a particular trait in cows they wished to introduce into their own herds, they bought a few head from time to time. This cost was one over which ranchers had some control.

Table 11--Southwest cattle ranches: Livestock replacement costs per typical ranch, 1964-72 1/

Year	Bulls			Calves			Other cattle			Total replacement cost
	Number	Price per head	Total cost	Number	Price per head	Total cost	Number	Price per head	Total cost	
	Number	--Dollars--		Number	--Dollars--		Number	---Dollars---		
1964---	3	380	1,140	0	--	0	14	115	1,610	2,750
1965---	4	380	1,520	30	85	2,550	0	--	0	4,070
1966---	5	400	2,000	10	80	800	0	--	0	2,800
1967---	5	420	2,100	5	90	450	0	--	0	2,550
1968---	4	452	1,808	15	126	1,890	0	--	0	3,698
1969---	5	452	2,260	0	--	0	10	188	1,880	4,140
1970---	3	470	1,410	0	--	0	2	170	340	1,750
1971---	4	519	2,076	0	--	0	0	--	0	2,076
1972---	5	548	2,740	0	--	0	0	--	0	2,740

1/ Preliminary.

Machinery and Fuel Costs Substantial

Operating costs of vehicles and machinery included costs of gasoline, oil, tires, and repairs. It did not include depreciation, insurance, taxes, and replacement costs. Southwest cow-calf ranchers travelled many miles each year in operating their ranches (table 12). They used almost a full range of equipment--automobiles mostly for errands, pickup trucks for small loans and herd inspection, 1 1/2- to 2-ton trucks for larger loads, and tractors for heavy work on roads and other improvements. To operate this equipment, ranchers used an average of about 5,500 gallons of gasoline or other fuels per year.

Operating cost for ranch pickups was the largest single machinery cost on Southwest cow-calf ranches. The operator, unpaid members of his family, and the hired hand used these trucks almost daily, either maintaining improvements, hauling supplies, or inspecting or moving livestock.

Total vehicle and machinery operating costs per ranch were $2,400 to $3,000 per year. This cost increased 26 percent during 1964-72.

Table 12--Southwest cattle ranches: Vehicle and machinery operating costs 1/ per typical ranch studied, 1964-72 2/

Item	Unit	1964	1965	1966	1967	1968	1969	1970	1971	1972
Automobile (ranch share):										
Miles traveled--	Miles	9,000	9,025	9,100	9,150	9,250	9,280	9,300	9,250	9,250
Cost per mile---	Dol.	.050	.050	.051	.052	.054	.055	.056	.057	.058
Operating costs-	Do.	450	451	464	476	500	510	521	527	536
Pickup trucks:										
Miles traveled--	Miles	32,000	32,500	32,700	32,900	33,100	33,090	34,000	34,000	34,000
Cost per mile---	Dol.	.050	.051	.053	.055	.058	.059	.060	.061	.061
Operating costs-	Do.	1,600	1,658	1,733	1,810	1,920	1,952	2,040	2,074	2,074
Other motor trucks:										
Miles traveled--	Miles	2,000	2,000	2,010	2,010	2,020	2,030	2,050	2,080	2,100
Cost per mile---	Dol.	.069	.069	.070	.073	.075	.076	.077	.079	.080
Operating costs-	Do.	138	138	141	147	152	154	158	164	168
Tractors:										
Hours used------	Hours	340	345	350	355	360	361	330	330	330
Cost per hour---	Dol.	.600	.610	.620	.640	.660	.680	.700	.710	.710
Operating costs-	Do.	204	210	217	227	238	245	231	234	234
Total vehicle and machinery operating costs--	Do.	2,392	2,457	2,555	2,660	2,810	2,861	2,950	2,999	3,012

1/ Includes gas, oil, tires, and repairs. Does not include depreciation, insurance, taxes, and replacement costs.
2/ Preliminary.

Large amounts of fuel and electrical energy are required to produce beef cattle. On Southwest cow-calf ranches, approximately 4 gallons of gasoline and 62 kilowatt hours of electricity were used to produce 100 pounds of beef animals in 1972. Sixteen gallons of gas and 248 kilowatt hours of electricity were required to produce one 400-pound calf.

Building and Range Improvement Costs Rise Slowly

Range improvements and repair and maintenance of buildings averaged $1,800 to $2,100 per year on Southwest cow-calf ranches during 1964-72 (table 13). This cost did not include labor costs, except when ranchers contracted for maintenance and repairs.

Water developments, including windmills and motors, pumps, pipe, tanks (both steel-rim and earthen), water troughs, float valves, and in some cases, automatic electric controls, required constant maintenance and occasional replacement and represented the largest category of improvement costs. The second largest improvement cost category included fence repairs and occasional replacement of fence portions beyond repair. Also included in other range developments were costs of repair and maintenance of corrals, windbreaks, shelters, feed troughs, and an occasional expense for brush or insect control.

Property Taxes Increase

Property taxes were paid mostly for real property (land, buildings, and improvements) but also included personal property (mostly vehicles and livestock). (See table 14.) Tax rates are based on assessed values, which are usually some percentage of market value as determined by the county assessor at the time property is appraised. Assessed values do not change much from year to year. As real property increased in value at a rate of about 6 percent per year from 1964 to 1972 and personal property increased at a rate of about 8 percent, the tax rate per $100 of current value declined on real property and remained almost at the same level for personal property. Property taxes per Southwest cow-calf ranch increased 46 percent from 1964 to 1972.

Hired Labor Costs Up Sharply

Some ranchers in the Southwest operated with little or no hired labor, particularly those with less than 100 head of cows or those who had several children old enough to be helpful on the ranch. However, when cattle numbers were increased to 300-400 per ranch, most ranchers hired a full-time employee. Additionally, day labor was hired during peak labor demand periods such as branding and shipping times.

During 1964-72, labor cost on ranches increased 76 percent, more than did almost any other cost (table 15). Almost the same amount of labor was hired in 1972 as in 1964. The labor cost, one of the largest costs on cow-calf ranches, exceeded $5,500 in 1972.

Table 13--Southwest cattle ranches: Building and range improvement repair and maintenance costs per typical ranch studied, 1964-72 1/

Year	Service buildings	Water developments	Other range developments	Total costs
		Dollars		
1964	300	850	612	1,762
1965	306	858	633	1,797
1966	316	884	672	1,872
1967	334	902	693	1,929
1968	340	938	705	1,983
1969	344	965	719	2,028
1970	347	980	738	2,065
1971	352	989	732	2,073
1972	360	993	741	2,094

1/ Preliminary.

Other Expenditures Are Mainly Utilities

Other expenditures were mostly for utilities needed in operating the ranch. Electric power was used on the ranch for many other uses than in the ranch house. Most service buildings, particularly the shop, were wired for electricity. Although windmills were popular in isolated areas, domestic wells and stock wells near the highline were usually powered with electric pumps. Most ranchers in the Southwest had telephones, although few of them had phones other than those at the headquarters.

Insurance, both on buildings and vehicles, was the second largest component of other expenditures (table 16). Insurance costs increased 66 percent from 1964 to 1972, mostly because of increases in insurance rates rather than because of changes in coverage. Most ranchers in the Southwest insured all of their vehicles for public liability and property damage, insured their newer vehicles for comprehensive coverage, and some insured against collision. Also, ranchers commonly carried a fire liability policy on buildings at the ranch headquarters. Some heavily indebted ranchers also carried term life insurance or mortgage insurance when lenders insisted on it.

Table 14--Southwest cattle ranches: Property taxes per typical ranch studied, 1964-72 1/

Year	Real property			Personal property 2/			Total taxes paid
	Total value	Tax rate per $100	Total tax	Total value	Tax rate per $100	Total tax	
				Dollars			
1964-----	304,480	.45	1,370	59,750	.30	179	1,549
1965-----	316,150	.45	1,423	53,330	.30	160	1,583
1966-----	346,840	.46	1,595	63,060	.31	195	1,790
1967-----	397,050	.46	1,826	67,340	.32	215	2,041
1968-----	411,890	.44	1,812	69,390	.32	222	2,034
1969-----	434,450	.41	1,781	85,170	.33	281	2,062
1970-----	440,440	.41	1,806	85,528	.34	291	2,097
1971-----	446,300	.42	1,874	97,740	.32	313	2,187
1972-----	452,460	.43	1,946	104,270	.31	323	2,269

1/ Preliminary.
2/ Livestock, vehicles, machinery, and equipment.

With commercialized operations with assets of over $500,000 and receipts in the $40,000 class, ranchers have adopted some business practices. During 1964-72, they attended several meetings per year other than those in their local communities, subscribed to livestock and/or business magazines, belonged to livestock associations, and occasionally bought advertisements for needed help and supplies or for upcoming sales. This group of expenditures amounted to $300 to $400 per year.

INVESTMENT, COSTS, AND RETURNS SUMMARIZED

In 1969, the average investment per ranch with 390-400 cattle (275-300 brood cows and heifers) exceeded $500,000 (table 17). For each dollar invested in cattle, Southwest cow-calf ranchers had $5 to $6 invested in land and improvements.

The rate of turnover in capital was very low on cattle ranches. Even with an investment exceeding $500,000 cash receipts per ranch were usually less than $40,000, reaching this level only in 1972. During 1964-72, gross ranch income, including cash receipts, inventory changes in livestock, and the value of

Table 15--Southwest cattle ranches: Hired labor costs per typical ranch studied, 1964-72 1/

Year	Full time labor		Day labor			Food and supplies	Total hired labor cost
	Rate per month	Total cost	Days hired	Rate per day	Total cost		
	---Dollars---		Days	------------Dollars------------			
1964------	173	2,076	89	7.29	649	416	3,141
1965------	186	2,232	88	7.80	686	432	3,350
1966------	200	2,400	90	8.35	752	448	3,600
1967------	213	2,556	88	9.00	792	464	3,812
1968------	234	2,808	100	9.85	985	493	4,286
1969------	266	3,192	100	11.19	1,119	510	4,821
1970------	274	3,288	74	11.50	851	527	4,666
1971------	298	3,576	87	12.00	1,044	528	5,148
1972------	319	3,828	90	12.80	1,152	560	5,540

1/ Preliminary.

perquisites was $30,000 to $40,000 for 7 of the 9 years. Therefore, for each $100 investment, ranchers realized a gross income of less than $13.

The return to the operator for his labor and management and capital used on the ranch (excluding land not owned by the operator) averaged about $11,000 per year. A loss was experienced in 1964. In 1972, a combination of favorable range conditions and favorable livestock market prices increased ranch returns to $25,000, or 127 percent above the average.

PRODUCTION, COSTS, AND PRICE INDEXES COMPARED

Net ranch production is the amount of cattle produced, valued at 1965-67 prices, less the amount of livestock and feed purchases, also valued at 1965-67 prices. Essentially, net ranch production is an index of the change in productivity without the influence of price changes and feed and livestock resources brought onto the ranch. During 1964-72, net production varied from an index of 76 to an index of 103 on Southwest cow-calf ranches (table 18). After a 4-year plateau of relatively high production from 1965 to 1968, production fell sharply in 1971.

Table 16--Southwest cattle ranches: Other expenditures per typical ranch studied, 1964-72 1/

Year	Telephone	Electric power	Insurance	Miscellaneous 2/	Total expenditures
			Dollars		
1964---------	240	327	416	306	1,289
1965---------	238	327	448	314	1,327
1966---------	231	351	488	322	1,392
1967---------	229	378	522	328	1,457
1968---------	226	378	554	345	1,503
1969---------	219	403	595	362	1,579
1970---------	215	344	648	363	1,570
1971---------	222	377	659	360	1,618
1972---------	233	406	691	389	1,719

1/ Preliminary.
2/ Subscriptions, association dues, advertising, and commercial travel.

The index of range conditions varied less during the period than did the index of net production, with the lowest level of 93 in 1971, and the highest level of 103 in 1966.

Production per unit of input is a measure of ranch productivity. It is the total value of production at 1965-67 prices divided by the total value of the resources used in production, also at 1965-67 prices. Production per unit of input was much the same as net production on Southwest cow-calf ranches. A small change in range conditions, particularly when the index of range conditions fell below 97, resulted in a large change in production per unit of input.

Operating expense per unit of production is an index of the current expenses (including current prices paid by ranchers for the various items used in production) divided by the value of products produced on the ranch (excluding changes in prices received by ranchers for the various kinds of products they produced). It is a measure of current cash and noncash costs per unit of production at 1965-67 prices as well as the quantities and prices of resources used. Operating expense per unit of production peaked in the drought year of 1971, when it was 66 percent higher than the 1965-67 average.

Table 17--Southwest cattle ranches: Summary of investments, costs, and returns per ranch, 1964-72 1/

Item	1964	1965	1966	1967	1968	1969	1970	1971	1972
					Number				
Livestock on ranch:									
All cattle	387	393	393	387	392	393	395	387	397
Brood cows & heifers	304	301	289	300	304	309	277	279	275
					Dollars				
Total ranch capital, Jan. 1	364,230	369,480	409,900	464,390	481,280	519,620	525,970	544,040	556,730
Land	243,840	254,000	281,940	330,200	343,140	363,780	368,940	374,100	379,260
Buildings & improvements	60,640	62,150	64,900	66,850	68,750	70,670	71,500	72,200	73,200
Livestock	49,650	43,050	52,570	56,400	58,020	73,320	73,150	85,590	91,460
Machinery & equipment	10,100	10,280	10,490	10,940	11,370	11,850	12,380	12,150	12,810
Total cash receipts	20,402	31,512	32,348	30,031	33,636	39,602	35,589	37,611	40,228
Calves	12,100	15,895	19,006	18,966	20,923	19,869	18,126	19,350	31,429
Steers & heifers	2,268	7,208	5,869	4,320	5,515	4,776	10,424	7,405	3,402
Cows & bulls	6,034	8,409	7,473	6,745	7,198	14,957	7,039	10,856	5,397
Value of perquisites	1,188	1,286	1,527	1,415	1,485	1,772	1,791	2,035	2,483
Change in inventory	162	-272	213	1,186	294	-1,848	-788	1,040	11,900
Gross ranch income	21,752	32,526	34,088	32,632	35,415	39,526	36,592	40,686	54,611
Total operating expenses	22,935	23,749	23,359	23,868	25,137	27,352	26,562	29,899	29,009
Feed & grazing fees	8,277	7,352	7,489	7,451	6,779	7,734	9,262	11,490	9,191
Other livestock expense	3,038	4,383	3,137	2,916	4,091	4,558	2,188	2,633	3,335
Machinery expense	3,879	3,957	4,079	4,262	4,461	4,570	4,714	4,750	4,861
Buildings & fences	1,762	1,797	1,872	1,929	1,983	2,028	2,065	2,073	2,094
Property taxes	1,549	1,583	1,790	2,041	2,034	2,062	2,097	2,187	2,269
Hired labor	3,141	3,350	3,600	3,812	4,286	4,821	4,666	5,148	5,540
Other expenses	1,289	1,327	1,392	1,457	1,503	1,579	1,570	1,618	1,719
Return to operator--labor and management and total capital	-1,183	8,777	10,729	8,764	10,278	12,174	10,030	10,787	25,602

1/ Preliminary.

Table 18--Southwest cattle ranches: Production, costs, and prices, 1964-72 1/

Item	1964	1965	1966	1967	1968	1969	1970	1971	1972
	1965-1967=100								
Net ranch production	79	103	101	96	99	91	84	76	95
Range conditions	90	100	103	97	103	101	99	93	101
Production per unit of input	80	100	102	98	99	89	85	74	96
Operating expense per unit of production	123	98	98	104	107	127	134	166	129
Total cost per unit of production	116	93	97	110	113	134	146	172	138
Prices received for products sold	77	93	103	104	111	128	130	148	177
Prices paid, including wages to hired labor	98	96	100	104	108	112	115	121	126

1/ Preliminary.

Total cost per unit of production differs from operating expense per unit of production. In the total cost measure, charges are added to operating expenses for the operator labor and management and for the capital used in the ranch enterprise. Total cost per unit of production varied widely during the 9 years studied, reaching a high in 1971 and a low in 1965.

The indexes of prices received and paid include prices of all operating expenses weighted by the size of each expense and the prices of all products weighted by amounts produced. The index of prices received increased 100 index points from 1964 to 1972, with almost half of the gain occurring in the last 2 years. The index of prices paid, after a slight decline from 1964 to 1966 increased steadily from three to six index points per year. Since the base period 1965-67, prices received by ranchers have increased much more rapidly than have the prices paid by them.

Assets Appreciate, Other Returns Vary

Several other measures of returns are available other than the net return to operator labor, management, and capital, which is often referred to as net ranch income.

When the interest paid on mortgage loans is subtracted from net ranch income, the remainder is the income available for family living. Until 1972, little income was available on this basis for family living (table 19). Rather, Southwest cow-calf producers mostly increased their mortgages and loans during 1964-71. Interest charges were paid by refinancing larger and larger loans.

Table 19--Southwest cattle ranches: Returns to resources per typical ranch studied, 1964-72 1/

Item	Unit	1964	1965	1966	1967	1968	1969	1970	1971	1972
Net ranch income	Dol.	-1,183	8,777	10,729	8,764	10,278	12,174	10,030	10,787	25,602
Interest paid on mortgage and loans 2/	Do.	3,725	4,200	4,788	5,575	6,255	6,695	7,644	7,361	7,925
Income available for family living	Do.	-4,908	4,577	5,941	3,189	4,023	5,479	2,386	3,426	17,677
Asset appreciation 3/	Do.	5,412	40,148	54,277	15,704	32,726	8,196	18,860	55,690	57,380
Return to resources	Do.	504	44,725	60,218	18,893	36,749	13,675	21,246	59,116	75,057
Charge for operator's services 4/	Do.	3,001	3,222	3,448	3,659	4,003	4,500	4,637	4,998	5,345
Return to operator's equity capital	Do.	-2,497	41,503	56,770	15,234	32,746	9,175	16,609	54,118	69,712
Operator's equity capital	Do.	300,200	298,790	331,470	376,250	384,490	417,620	417,970	434,560	443,230
Total ranch capital	Do.	364,230	369,480	409,900	464,390	481,280	519,620	525,970	544,040	556,730
Return on operator's equity capital	Pct.	-.8	13.9	17.1	4.0	8.5	2.2	4.0	12.5	15.7
Return on total capital 5/	Do.	.3	12.4	15.0	4.5	8.1	3.1	4.6	11.3	13.9
Interest rate paid on mortgage and loans	Do.	5.8	5.9	6.1	6.3	6.5	6.6	7.1	6.7	7.0
Financial leverage 6/	Ratio	.14	1.12	1.14	.90	1.05	.72	.86	1.10	1.17

1/ Preliminary. 2/ Real estate mortgage and loans multiplied by current rates on mortgages outstanding and current operating loan interest rates. 3/ Change in value of total assets during year less inventory change and adjustment for additions to owned land (in 1968). 4/ Annual wage rate to year-round hands multiplied by $1.25 plus board. 5/ Return to operator's equity plus interest paid on mortgages divided by total ranch capital. 6/ The difference between the amount the total assets earned and the amount the owner should have earned, based on his equity expressed as a ratio.

Family living competed with ranch production expenses and left little available for interest payments and debt reduction.

One of the major reasons that ranchers continue as ranchers, other than the fact that they may enjoy ranch life, is that they gain from the rapid appreciation in the value of their investment. With very large amounts of land per ranch, a small increase in land values can result in a substantial increase in the dollar value of ranch assets. Asset appreciation per ranch varied from $5,400 in 1964 to $50,000 to $60,000 in 3 separate years during 1964-72.

There are two major arguments for using asset appreciation in a returns statement. If returns on capital in ranching are to be compared with returns when capital is invested in other alternatives, ranch returns tend to be underestimated since land usually increases in value faster than other kinds of assets. This is true particularly when the rate of return on ranch capital is compared with the interest rate on savings and bonds whose face values do not change. Secondly, when capital is borrowed and used to buy additional land, ranchers may benefit in two ways. The land earns income (rent) in that livestock are produced on it. In addition, the land usually appreciates in value while the mortgage does not. In effect, ranchers are using capital belonging to others to realize these gains.

The major arguments against using asset appreciation in a returns statement are: (1) the rancher-owner does not realize land appreciation unless the ranch is sold, and few ranchers sell their ranches since it is a lifetime occupation for most of them; (2) asset appreciation may be so large and variable that it overshadows various ranch economic measures such as net ranch income and return to labor and management; and (3) it is an unearned increment in that land appreciates usually with little or no effort by the owner.

The returns to resources, including asset appreciation, averaged $37,000 per year but varied widely from $500 in 1964 to $75,000 in 1972. Annual changes in land prices were mainly responsible for the wide variation.

Operator's services were valued at hired-labor wage rates plus 25 percent and the value of food provided by the rancher for his hired labor. The return to operator's equity capital was the difference between return to resources and the charge for the operator's labor and management. The return to equity capital frequently is divided by the owner's equity to determine a rate of return.

Return on owner's equity capital varied widely, from a loss in 1964 to a gain of 17 percent in 1966. The average for 1964-72 was 8.6 percent. The average rate paid on mortgages and loans by ranchers over the same period was 6.4 percent. Ranchers gained an average of 2.2 percent per year on their mortgages and loans and 8.6 percent on their assets that were debt free.

Financial leverage is a method of combining net earnings from mortgages and debt-free assets. If financial leverage, expressed as a ratio, is 1.0, then the rancher broke even on his mortgages and loans--that is, the rate of earnings on all capital was equal to the interest rate paid on mortgages and loans. If the ratio is less than 1.0, earnings were less than the interest rate. If the ratio is more than 1.0, earnings were more than the interest rate. A ratio of 1.12 (as in 1965) meant that net earnings on the portion mortgaged were large enough so that when added to earnings on the debt-free portion, the rate of return based on the debt-free portion was 112 percent of the average mortgage interest rate.

Financial leverage was unfavorable in 4 of the 9 years studied. It was least favorable in 1964 and most favorable in 1972. The average leverage ratio was 0.91, mainly because of the unfavorable ratio in 1964. No trends occurred in financial leverage on Southwest cow-calf ranches during 1964-72. However, the average ratio in 1970-72 was 1.04.

Capital Costs Boost Production Costs

Total cost of producing feeder stock in 1972 amounted to $55.24 per hundredweight on Southwest cow-calf ranches (table 20). This cost was almost the same as the cost a year earlier, but 50 percent higher than in 1965-67. The cost increased at an average of 5 percent per year during 1964-72, while prices received for feeders rose 16 percent per year.

Most of the increase in production costs was caused by the very large increase in capital investment, which accounted for more than half of total production costs during 1970-72. Land values and livestock prices have increased much more since 1964 than have wage rates and prices of other resources such as feed, machinery, taxes, and building and fence materials. Operating costs per 100 pounds of feeder stock produced went up about 16 percent from 1964 to 1972 on Southwest cow-calf ranches. Capital costs increased 74 percent.

The second largest cost item was the feed and grazing fee cost. Labor costs ranked third. (If operator labor and management cost would have been added to hired labor cost, then the combined labor cost would have ranked second.) Operator labor and management cost accounted for only 7 percent of the production costs.

The very large investment in real estate on Southwest cow-calf ranches is demonstrated by the fact that in 1972 real estate investment accounted for over 81 percent of total investment--$342 per $421 of investment per hundredweight of stock produced. This proportion changed from 85 percent in 1965-67, mainly because of the increased value of breeding livestock in 1969-72.

Table 20--Investments, costs, and prices per 100 pounds of feeder stock produced, Southwest cattle ranches, 1964-72 1/

Item	1964	1965	1966	1967	1968	1969	1970	1971	1972
					Dollars				
Investment:									
Total	300	233	280	382	346	440	459	421	421
Real estate	251	199	237	327	296	368	384	345	342
Livestock	41	27	36	46	42	62	64	66	69
Machinery	8	7	7	9	8	10	11	10	10
Cost:									
Total operating	18.92	14.96	15.97	19.63	18.06	23.18	23.16	23.12	21.94
Feed and grazing	6.83	4.63	5.12	6.13	4.87	6.55	8.07	8.89	6.95
Livestock replacements	2.51	2.76	2.15	2.40	2.94	3.86	1.91	2.04	2.52
Machinery	3.20	2.49	2.79	3.50	3.21	3.87	4.11	3.67	3.68
Buildings	1.45	1.13	1.28	1.59	1.42	1.72	1.80	1.60	1.58
Hired labor	2.59	2.11	2.46	3.13	3.08	4.09	4.07	3.98	4.19
Property taxes	1.28	1.00	1.22	1.68	1.46	1.75	1.83	1.69	1.72
Other	1.06	.84	.95	1.20	1.08	1.34	1.37	1.25	1.30
Operator labor 2/	2.48	2.03	2.36	3.01	2.88	3.81	4.04	3.86	4.04
Capital 3/	16.83	13.32	16.02	22.69	21.40	27.70	32.23	28.31	29.26
Prices received:									
Calves	18.99	22.84	25.74	26.06	27.62	31.10	33.45	38.36	47.12
Steers and heifers	16.74	20.67	23.15	23.15	24.60	28.52	28.72	32.20	36.35
Cows	11.39	14.06	15.75	15.75	16.73	19.40	19.54	22.10	27.00
Weighted average	15.83	19.40	22.50	22.83	24.21	25.49	28.48	31.19	43.02
					Cwt.				
Net production	1,212	1,588	1,463	1,216	1,392	1,180	1,147	1,293	1,322

1/ Preliminary.

2/ Wage charged for operator labor and management is approximately one-fourth above the rate paid for regular hired hands.

3/ Real estate is charged at interest rates on real estate loans outstanding. Investment in livestock, machinery, and equipment is charged at average interest rates on operating loans.